

Where Human Capital Meets Innovation: Creating a Framework for Measuring Distributed Innovation

I. Description of Proposal - Setting the Context: Focused on Category 2

You get what you measure. Businesses have lived that well worn adage for years, often to disastrous results. The same holds for innovation. We have lots of different measures of how to create and checklists of things to do to support innovation. And where do we stand? The business innovation process is broken. This critical process, whereby businesses attain competitive advantage and economies realize economic returns, is inherently inefficient and fragmented. Consider the numbers:

Over \$2.2 billion *daily* is spent in the United States and the OECD countries on R&D.¹ And this is only the clearly defined, “hard” R&D; it does not include monies and efforts spent on “softer” innovations, such as branding, market positioning, process innovation and so on. The “success rate,” or yield, of these innovation-based investments is dismal. An *Economist* article described that every 3,000 ideas engender 400 proposed projects leading to 14 funded initiatives resulting in only 1 successful outcome. Put differently, only .005% of innovation ideas get funded, of which only 7% *of those* make any money. (And we all used to think that finding a truly talented American Idol was a problem!) Another survey of venture capital firms finds that even with their investment scrutiny, tightened up significantly following the dot.com bubble, only 1 in 14 of their portfolio investments results in profit. And, according to the Gartner Group, one of the world’s leading analyst groups on organizational and IT performance, over 75% of a global 2000 IT budget is spent on maintaining existing applications, rather than devoted to developing, much less deploying, new products and services.

In spite of this poor investment performance, corporate demand for different types of innovation – business processes, applications, business models, products, services and organizational design - has never been more acute. Marketplace uncertainty, efficiency pressures, disruptive technologies, changing legislative and regulatory environments, demographic shifts and other drivers of business transformation are forcing companies into tighter and tighter cycles of higher

¹ Richard Razgaitis, *Valuation and Pricing of Technology-Based Intellectual Property* (New York: John Wiley & Sons, 2003), pp, 3-4, and Navi Radjou, *Innovation Networks*. Forrester Research, June 2004.

and higher performance. Because of this, they are being forced to innovate faster and more efficiently – to create *new* sources of revenue as well as maximize revenue and profit from *existing* sources. Consequently, increasing the yield and effectiveness of innovation-based investments becomes critical – to meet aggressive goals.

The King is Dead, Long Live the King

Increasingly, corporations are aggressively seeking to take advantage of innovation occurring “outside” or beyond organizational walls. We are at an early stage of a dramatic market shift in which a large proportion of corporate R&D expenditure is being re-channeled from traditional, “on balance sheet” R&D activity to acquisition of market-tested innovation from new ventures and small companies and/or from large enterprises monetizing existing intellectual assets. A new structural market mechanism to exploit innovation exists – called Distributed Innovation Networks (DINs). They are adaptive responses to changing market requirements, new designs and practices for businesses to increase the velocity and impact of their innovation investments. As such, DINs are mechanisms to monetize intellectual assets at greater scale and lesser risk than we have seen before.

And here it gets interesting. We have no capability, as of yet, to crisply understand, much less measure, the socio-economic implications of this dramatically emerging model of Distributed Innovation Networks. Our innovation measurement systems and capabilities are designed for function-specific activities (IT, R&D, patents, marketing, or whatever), as opposed to a systemic set of both lagging and leading measures to both anticipate and measure business outcomes, from a distributed network perspective – as the emergence of DINs requires.

At the same time, the “flatness” of the global economy and the ever-increasing globalized “footprint” of many businesses – in market focus if not in structure – has created a significant new set of materials, advisory and “measurement” attention, on how to source, attract, retain, and retrain critical “talent”, “human capital” – people – to extend this global flatness to different industries, different markets, different geographies, different consumers. The power of “flatness,” as articulated by Thomas Friedman in his best-selling book, *The World is Flat*, is that business ideas can quickly be transformed into globally dispersed businesses, networked and realized through an increasingly comprehensive set of technology and operational standards to facilitate the flow of designs, products and services worldwide. Ideas are transformed into “human capital” that is codified into globally designed and operationally relevant products and services – which is why the topic of “human capital” and that of globally relevant, and

appropriately trained “talent” is increasingly such a hot topic.²

Yet, here’s a problem: discussions around “talent” and human capital remain soft and fluffy. How do we “harden” the concept of human capital to make it as much as operationally relevant as it is a conceptually interesting question? How do you “monetize” the soft, fluffy conversations around human capital? After all, what is far too often missing in the majority and arguably all “hard” measurements of business effectiveness, and innovation, is what is, arguably one of the most critical elements: namely, the conversion of tacit into codified knowledge. Tacit knowledge comprises the embedded knowledge in people’s head – the “ah-ha” moment of converting a cool idea into a potentially hard and monetizable asset -, or is embedded into business rules and applications that have been built up (or cobbled together) over time. Tacit knowledge, by definition, is impossible to see; the challenge for effective innovation – again, defined as the development of new capabilities creating measurable business impact – is to convert this “tacit knowledge” into codified knowledge in a manner that it can be scaled, and used, by many people, via documented and consistent processes, applications, and so on.³

From this perspective, a fundamental issue for measuring innovation effectively is understanding “where human capital meets innovation”. Both concepts are currently fuzzy, poorly defined and even more anemically, understood in terms of their interaction and how to support them, from both business and policy actions. Too often, both are discussed, and measured, with respect to “lagging” or silo-based measures “because that’s all we can ‘see’ and/or have been trained to ‘measure’” as opposed to be developing sets of both lagging & leading indicators based on understanding how they interact systemically.

There are many ways to re-conceptualize “where human capital meets innovation.” Exploring their interaction through Distributed Innovation Networks provides pragmatic benefits in terms of 1) understanding a significant and structural market shift occurring in terms of how innovation is being identified, sourced, funded, and exploited and 2) practical means of how “innovation *inputs*” become *converted* into business and economic “*outputs*” with attendant implications of what to measure, and how to do so. DINs are, at their core, mechanisms to monetize intellectual assets – transforming ideas into human capital – based on new models to identify, source, fund and get-to-market (e.g., exploit)

² Discussion with Mike Bekins, COO of Korn Ferry, AsiaPac. January, 2007.

³ See Ralph Welborn and Vince Kasten, *The Jericho Principle: How Companies Use Strategic Collaboration to Find New Sources of Value* (John Wiley, 2003).

innovation. Building new sets of innovation measures around an emerging model for innovation has interesting implications for both strategy and policy professionals, which we'll discuss later.

Pulling it Together

I have always followed a simple mantra when doing transformation and strategy work globally: “make sense” and “take action”. Being able to “take action” effectively – e.g., establish new sets of measurements around innovation – requires knowing how to “make sense” of what it is that needs to be measured. “Making sense” of what is driving Distributed Innovation Networks (DINs) helps us understand what DINs are, and consequently, how we need to measure both them, and the innovations which they are designed to create.

DINs come in different flavors, suited for different purposes requiring different “roles” to be performed by different types of actors (large corporate, innovation sources (such as newcos, or other IP asset owners), capital sources and policy makers. Understanding DINs’ underlying “logic” and structure that both gives rise to them as “innovation engines” as well how they differ depending upon industry, geographic focus and polity (political, economic, and socio-cultural environment) are important to provide a framework to ensure that what we are measuring around innovation reflects business impact rather than mere expediency of what can easily be measured, which is our tendency today.

The Din of DINs – The Rationale & Methods of Analysis

DINs are new market mechanisms to identify, source, fund and exploit innovation. They reflect a significant shift in terms of, bluntly, the “innovation process.” As such, they serve as a provocative method to get insight into the interactions among the different “innovation variables” and environment that influence those variables. So doing, they help us “make sense” differently on “what works” and consequently, what and how we should be both measuring, and nurturing, innovation.

II. Impact of Proposal of Innovation Measurement

Improving Innovation Measurement

Innovation is defined as the development of new capabilities to engender new products, services, revenue, and employment. Three fundamental challenges exist with extant innovation measurements.

- *The Input Factor Bias.* Many of the measurements measure the “hard”, easily measurable “input factors” for what we believe to contribute to innovation.

Government officials, policy wonks and multiple trade associations, including the ITAA (Information Technology Association of America) have been warning of the decline of American competitiveness for years. The decline of the number of mathematic and science graduates and its corollary, the number of U.S. patents – itself, a supposed proxy for how innovative and brain-rich and consequently competitive we are and will be in the foreseeable future – is dramatic, in comparison the growth of these numbers elsewhere.

According to the most recent data from the National Science Foundation, 1.2 million of the world's 2.8 million university degrees in science and engineering in 2000 were earned by Asian students in Asian universities, with only 400,000 granted in the United States. The U.S. percentage of engineering degrees granted worldwide has continued and will continue to decline. China, the European Union, Japan, Russia and India all award more engineering bachelor degrees than the United States. The U.S. graduates just 6% of worldwide engineering bachelor degrees. And, on the graduate degree side, nearly 55% of math and engineering Ph.D. degrees went to foreign nationals and of the lovely news we've all heard before, in terms of quality of math and science education overall, the United States ranked 37th in the world and only 8th in terms of the availability of scientists and engineers (with India ranking 3rd), according to the World Economic Forum. No doubt there is a tight relationship between the strength of scientists and mathematic skill-sets and scientific progress, but finding a direct correlation between this and the "lack of innovative capacity" is harder to find. This is why other measures of innovation are frequently used – to warn us to changes in innovation capacity. Two others in particular are common: the number of patents, and the percentage of R&D spent on sales – known as the R&D-to-sales ratio. Yet, in reality, neither measure is helpful.

Since 2006, Booz Allen has conducted a study on what they call the Global Innovation 1000, an annual roster of companies that spent the most of research and development worldwide. It is, to date, the most comprehensive effort to assess the influence of R&D on corporate performance. Their key finding is quite simple: money simply cannot buy effective innovation, or as they put it more prosaically, "deep pockets can be dry wells." They continue: "[t]here are no significant statistical relationships between R&D spending and the primary measures of financial or corporate success: sales and earnings growth, gross and operating profitability, market capitalization growth, and total shareholder returns." In fact, the only positive correlation they found between any performance and R&D spend is on gross profits. This comes as no surprise since researchers who study innovation estimate that 70 to 80 percent of the final unit cost of a

product – *the cost reflected in gross margin* – is driven by R&D-based design decisions, such as product specifications, the number and complexity of features in a device, the choice of standardized versus customized parts, or the selection of manufacturing process. As the Booz Allen report puts it, “[t]his correlation of R&D spending and gross margin shows that in many companies, the R&D silo has succeeded in its narrow goal: creating a lower-cost offering that thus yields a wider margin... for which a higher price can be charged.” They continue, “[u]nfortunately, for most companies – and for the Global Innovation 1000 overall – the financial value of fatter gross margins is not ultimately captured, presumably because it is eroded in the marketing, sales, operational, and administrative work required to bring the product to market.”⁴

Global R&D spending is highly concentrated among the top 1,000, accounting for about 85 percent of total global corporate R&D, and 55 percent of all R&D spending, including government and not-for-profit R&D. Another key metric the study focused on was the ratio of R&D spend to sales. As the report concludes: “There is simply no statistical relationship between the performance bang and the R&D buck.”⁵ Nor were any positive relationships found between financial performance and either patent counts or patent quality.

- *The Blind Man and the Elephant Challenge* – touching parts of the “innovation elephant” but without an overall understanding of how these “input” measures interact in any way, ignoring the “conversion” of those inputs into innovation “outputs”.

Many of the “input” variables we measure – patents, education / training, technology standards, privacy rules, IP laws, etc. are all interesting, by themselves, but difficult to figure out how they interact to support, or hinder, the development of new business and economic outcomes. They all reflect the third fundamental challenge of measuring innovation:

- *The Light is Better Over Here Challenge* – we measure what we can see, because measuring the “conversion” of inputs into business outcomes – and tacit knowledge into codified knowledge – is invisible.

⁴ Barry Jaruzelski, Kevin Dehoff and Rakesh Bordia, *The Global Innovation 1000... Strategy & Business*, 45, pp. 1-15, p7.

⁵ *Ibid.*, p6.

Making visible what is invisible is a key challenge here, and understanding how these inputs interact with each to support or hinder innovation, is the fundamental challenge. It is also a challenge that can be met by exploring, and exposing, the network of interactions that occur among innovation “inputs”, converting them into specific business “outputs” and economic outcomes. And, the way I propose as one means to do so is by exploring DINs as explicit market mechanisms to identify, create, fund, source and exploit innovation.

That there are different types of DINs, as well as conditions that impact which ones will be effective and which ones won't start to provide us with:

- An understanding of the set of innovation inputs that a) convert those inputs into business / economic outcomes as well as b) environmental factors (economic, polity and socio-cultural) that influence how those inputs interact
- A set of both lagging (which we tend to already have) with leading indicators. After all, innovation, by definition, involves attempts to deal with uncertainty – to “fit” into changing market and economic environments. Lagging indicators, such as the ones that we've discussed and are traditionally used, provide a rear-view mirror of what happened, but again without being able to anticipate what will work and, from a policy perspective, how to “prune the tree of uncertainty” innovation inherently faces.

DINs are market mechanisms to manage the risk of marketplace uncertainty by those involved in the innovation process: large corporates, innovation sources (newcos, IP assets, etc.) capital sources and policy actors. Exploring the underlying logic of DINs helps address both of these issues – of how inputs are converted and under what conditions, and thereby provides us with the start of new tools to measure and understanding the relationship between lagging and leading indicators for innovation.

